08/327979

ABSTRACT OF THE DISCLOSURE

A force, weight or position sensor unit and sensor element ~~is disclosed~~ in a first embodiment. In a second embodiment, the sensor element of the first embodiment is incorporated into an apparatus for microindentation hardness testing and surface imaging which allows immediate imaging of the surface subsequent to hardness testing. The sensor uses a multi-capacitor system having drive and pick-up plates mounted on an appropriate suspension system to provide the desired relative motion when a force is applied to the pick-up plate. The output signal is run through a buffer amplifier and synchronously demodulated to produce a signal proportional to force or displacement. The sensor element is mounted on a scanning tunneling microscope base and a sample mounted on the sensor. The force sensor is used for both measuring the applied force during microindentation or micro hardness testing and for imaging before and after the testing to achieve an atomic force microscope type image of the surface topography before and after indentation testing.